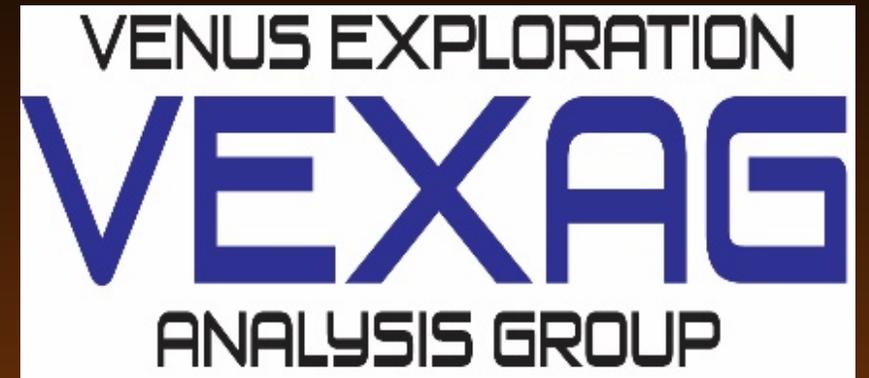


VEXAG Steering Committee

Darby Dyar (PSI, Mount Holyoke College), Chair
Noam Izenberg (Applied Physics Laboratory), Deputy
Giada Arney (NASA GSFC)
Lynn Carter (University of Arizona)
Natasha Johnson (NASA GSFC)
Candace Gray (NM State University)
Jeff Balcerski (Ohio Aerospace Institute)
Gary Hunter (NASA GRC)
Kevin McGouldrick (University of Colorado)
Pat McGovern (Lunar & Planetary Institute)
Joseph O'Rourke (ASU)
Emilie Royer (University of Colorado)
Jennifer Whitten (Tulane)
Colin Wilson (University of Oxford)
Tommy Thompson (JPL), Scribe
Megan Ansdell (NASA HQ) ex officio



VEXAG Steering Committee Rotation Schedule

Name, starting	2020		2021		2022		2023		2024		2025		2026	
	1/1	7/1	1/1	7/1	1/1	7/1	1/1	7/1	1/1	7/1	1/1	7/1	1/1	7/1
Darby Dyar														
Noam Izenberg														
Emeritus Chair														
Gary Hunter	1													
Kevin McGouldrick	1													
Colin Wilson	1	1	1	1										
Pat McGovern	1	1	1	1	1									
Candace Gray	1	1	1	1										
Joe O'Rourke	1	1	1	1										
Emilie Royer	1	1	1	1										
Giada Arney	1	1	1	1										
Jeff Balcerski		1	1	1	1	1								
Paul Byrne		1	1	1	1	1								
Jenny Whitten		1	1	1	1	1								
Natasha Johnson		1	1	1	1	1	1							
Stephen Kane		1	1	1	1	1	1							
			1	1	1	1	1	1						
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								1	1	1	1	1	1	
									1	1	1	1	1	1
										1	1	1	1	1
											1	1	1	1
												1	1	1
													1	1
TOTALS	10	11	13	15	11	13	12	12	12	10				

New 6-month rotation established, with 30% early career investigators required at all times.

Question for PAC: Formalities/ consistency of succession plans for AG leadership?

Ongoing Reorganization to Streamline VEXAG Management

VEXAG Monthly Meeting Schedule	
Month	Activities*
January	Review and approve Findings, submit to HQ. Two new members begin.
February	Plans for annual interAG meeting
March	Prepare for LPSC
April	Committee updates
May	Committee updates
June	Committee updates
July	Two new members begin.
August	Committee updates
September	Plan for annual meeting(s)
October	Review of CAPS and PAC presentations from Fall meetings; finalize planning for annual meeting; assign tasks for SC members at meeting
November	Annual meeting in person (Virtual 2020)
December	Review and vote on new Steering Committee members and committee assignment for the coming year. Plan for AGU Town Hall, if any.

*Each month will begin with reports HQ Liaison (if any) and from the standing Study Analysis Workgroups and other current Venus-related bodies.

VEXAG Subcommittees (current as of August 2020)

1. Nugget Officers: Pat and Jenny
2. Committee Organization Document Committee: Darby, Noam, Colin
3. Working Group for Next Off-season VEXAG meeting (2021):
AGU special session from Exoplanets in our Backyard
Noam, Giada, Stephen
4. Working Group for next VEXAG meeting (Nov 2020): Darby, Noam, Natasha
5. VeGASO committee: Joe, Paul, Emilie, Candace
6. Venus Surface Platform Study: Tibor, Darby, Noam
7. Venus Technology group: Jeff and others
8. Monthly/quarterly virtual seminar: Jeff and others — joint with other AGs?

Other VEXAG Commitments:

- **NExSS, Nexus for Exoplanet System Science**, is a NASA research coordination network dedicated to the study of planetary habitability. The goals of NExSS are to investigate the diversity of exoplanets and to learn how their history, geology, and climate interact to create the conditions for life.
- **ExoPAG Science Interest Group #3: Exoplanet / Solar System**, coordinates joint activities and an ongoing discussion on how Exoplanet and Solar System science and missions can benefit from each other. This SIG will endeavor to identify multiple initiatives that could be mutually beneficial for both communities and will encourage cross-disciplinary interaction between ExoPAGs and the Planetary AGs.
- **Equity, Diversity, and Inclusion Working Group**

DAVINCI+ will explore past and present Venus

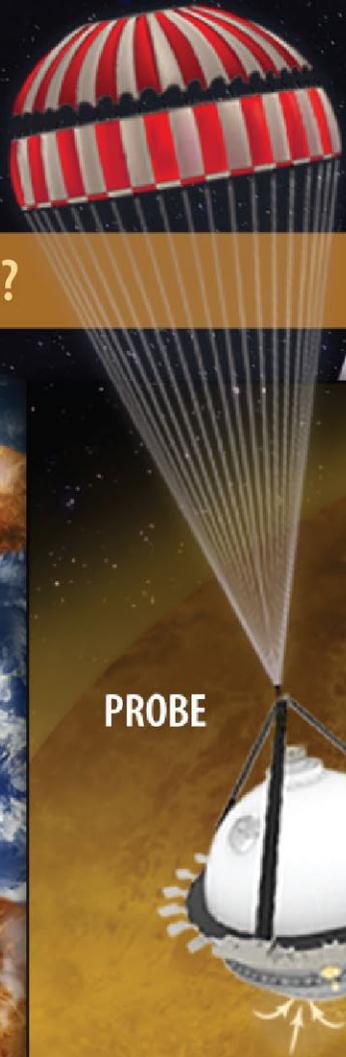
Deep Atmosphere Venus Investigation of Noble Gases, Chemistry, and Imaging *Plus*

Dr. James B. Garvin
NASA GSFC, Principal Investigator

Drs. Stephanie Getty and Giada Arney
NASA GSFC, Deputy Principal Investigators

*Establishing Venus' place
in our Solar System*

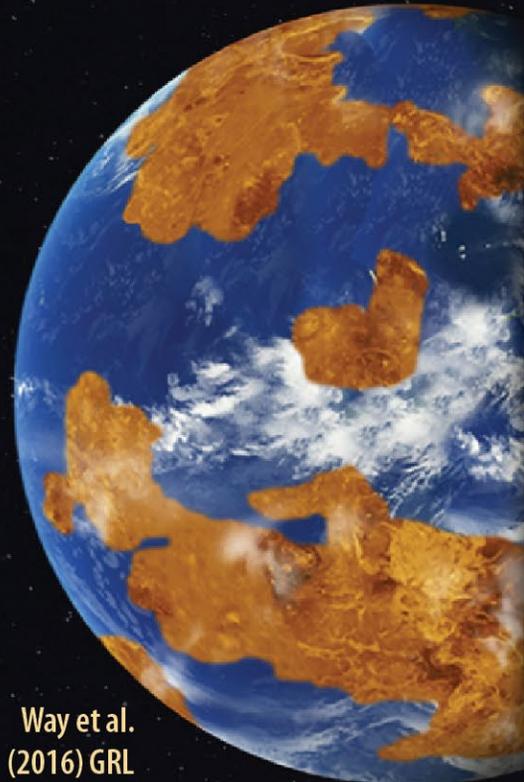
*Enabling exploration of Venus-like
exoplanets and Earths*



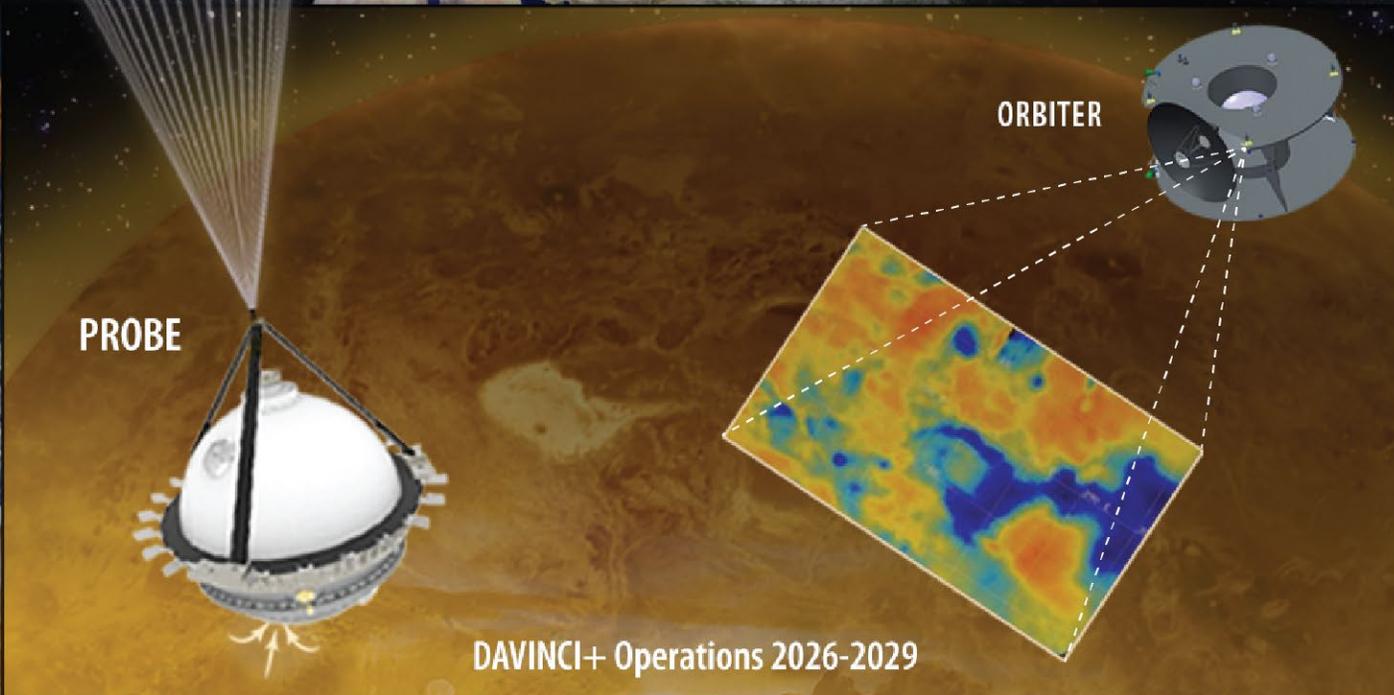
Ancient Oceans on Venus?

Evolution of Habitability

Venus-like Exoplanets



Way et al.
(2016) GRL



DAVINCI+ Operations 2026-2029

Major partners: Lockheed-Martin • JPL • MSSS • LaRC • ARC • APL • KinetX • University of Michigan



Kepler-69c

VERITAS

Venus Emissivity, Radio Science, InSAR,
Topography, & Spectroscopy

Science Goals

1 Rocky planet evolution

- 1a igneous rock type, surface-atmosphere interaction
- 1b ancient geologic processes
- 1c volcanic history
- 1d subduction, origins of plate tectonics

2 Active processes

Active and recent volcanism, tectonics?

3 Past and present water

- 3a continents from a wetter past?
- 3b current water outgassing?

Mission Overview

Launch Date: May 2025

Venus Orbit Insertion: Dec 2025

3 years of science operations from orbit

>40 Tb of science data returned

PI: Sue Smrekar, JPL; Managed by JPL

What makes a rocky planet habitable?

*Like Earth, Venus started with all the
building blocks of a habitable world.*

How was habitability lost?

High-Resolution Global Reconnaissance

1. VISAR (Venus Interferometric Synthetic Aperture Radar)

- Highest resolution global topography for terrestrial planets
- 1st planetary active deformation map

- Global data sets:

- Topography: 250 m horiz, 5 m vertical
- SAR imaging: 30 m

- Targeted data sets:

- SAR imaging: 15 m
- Surface deformation: 1.5 cm vertical

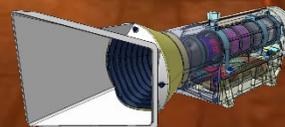
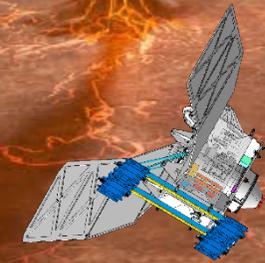
2. VEM (Venus Emissivity Mapper)

1st near-global map of igneous rock type, weathering

- 6 NIR surface bands with robust SNR
- 8 atmospheric bands for calibration / water vapor

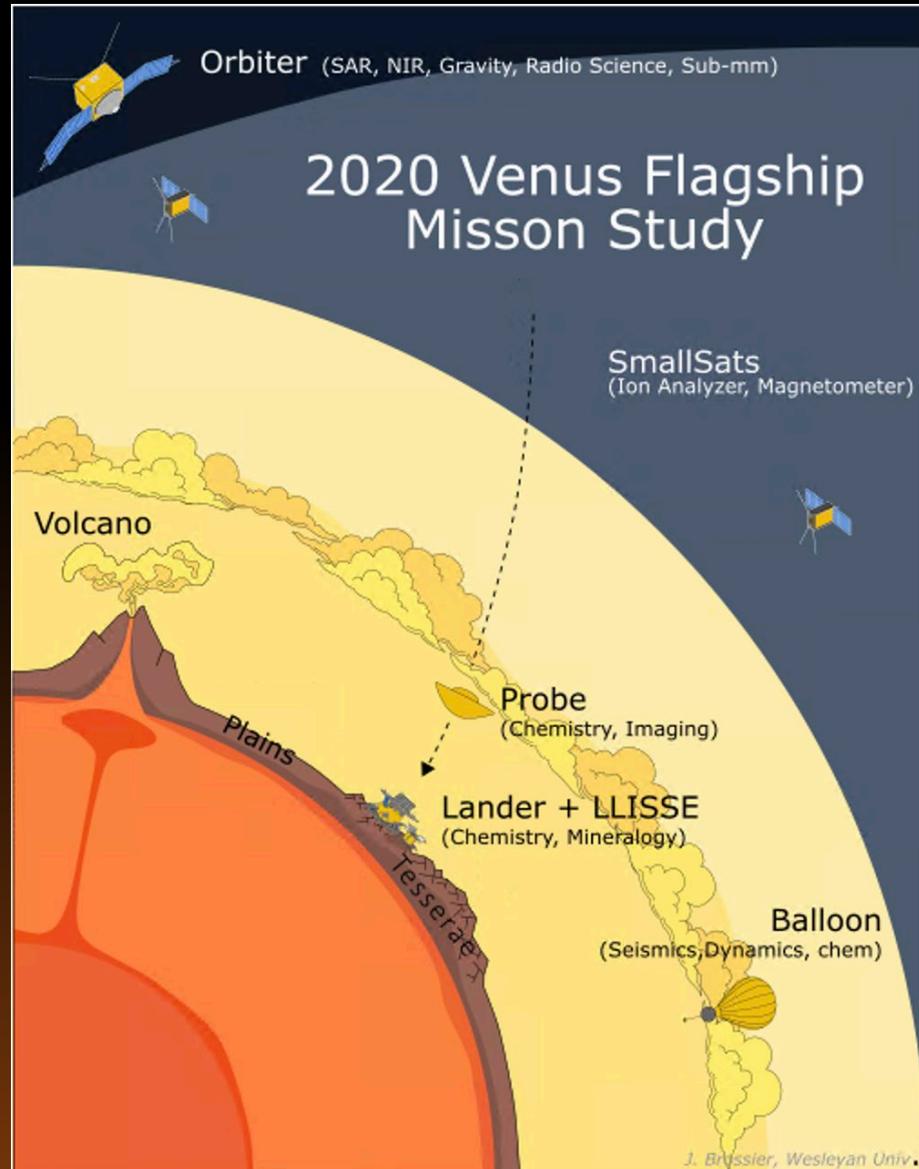
3. Gravity Science Investigation

1st global maps of derived elastic thickness & core size



Venus Flagship – A Mission to Assess the Habitability of Venus

Martha Gilmore, Wesleyan Univ., Pat Beauchamp, JPL, VFM Science Team, GSFC



Science Goals

1. History of volatiles and liquid water on Venus and determine if Venus was habitable.
2. Composition and climatological history of the surface of Venus and the present-day couplings between the surface and atmosphere.
3. The geologic history of Venus and whether Venus is active today.

Key Elements of Current Design

Launch ~2031, Cost target \$2B

Synergistic measurements between multiple assets

Orbiter and Small Sats -- support *in situ* assets prior to science campaign

Probe/Lander – 4-8 hour lifetime on tessera terrain

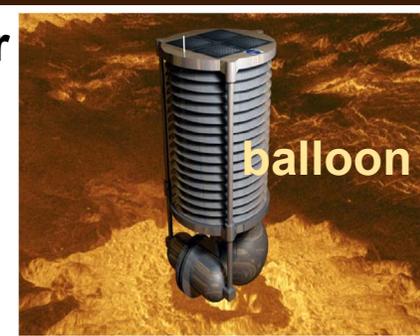
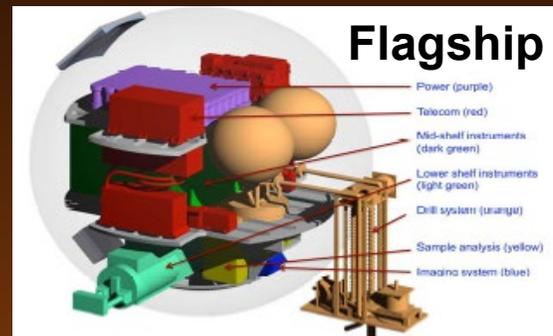
Balloon – 30 days

Long-lived lander (LLISSE) – 60 days

Status: DONE

Venus Surface Platform Study Status

- Implemented to understand state of capability for Venus surface exploration, explore what additional science can be achieved with increasing lander capability
- Two face-to-face meetings, telecons with experts from various Centers and Institutions
- 4 subgroups have produced a draft report and draft white paper. Both are in review / editing
- Identified 3 leading capabilities that drive science: lifetime, mobility, and “smarts”. Different degrees enable unique and compelling new science. Examples:
 - Increased lifetime enables temporal measurements, helps understand surface weather / climate. Lifetime also critical to seismology needed to gain insight into interior structure
 - Situational awareness and ability to make autonomous data based decisions (attributes of increasing “smarts”) can enable more productive targeting and/or sample acquisition and thus enable better knowledge of Venus geology, weathering, and history.
- Capabilities created, enhanced with specific technology investments (e.g., high temperature systems (sensors and electronics, memory, power); Mechanisms (actuators, drills, tools); introduction of autonomy: etc...)



18th Annual Meeting November 16–17, 2020 (VIRTUAL)

Session 1: 3 hours:

40 minutes of HQ presentation by Megan and/or Lori followed by 15 minutes of questions and a short break.
40 minutes of VEXAG Year in Review presentation by Darby followed by 15 minutes of questions and a short break.

15-minute presentations by VERITAS, DaVinci+, Envision

Session 2: 3 hours

15-minute presentations Akatsuki, Venera-D, Indian Space Agency, Heat-driven aircraft (Eldar)

30-minute presentation Flagship PCMS

1st round of lightning presentations

Session 3: 3 hours

Group A: 4-6 talks back to back on a similar theme, followed by questions, discussion, and a break

Group B: 4-6 talks back to back on a similar theme, followed by questions, discussion, and a break

Group C: 4-6 talks back to back on a similar theme, followed by questions, discussion, and a break

Session 4: 3 hours

2nd round of lightning presentations followed by a break

Group D: 4-6 talks back to back on a similar theme, followed by questions, discussion, and a break

Summary: Planning for VEAXG 2021, solicitation for new SC members, draft findings

VEXAG White Papers

35 and counting...



Venus Science Today

A Mini-Zoom conference 31 August - 3 September 2020

All are invited to consider attending and/or contributing a talk to Venus Science Today, a mini-Zoom conference.

Venus Science Today will showcase talks about Venus research published in the past 12 months, or work in progress. The conference will take place over four days, but only for two hours per day to allow simultaneous participation from Europe, the USA and East Asia.

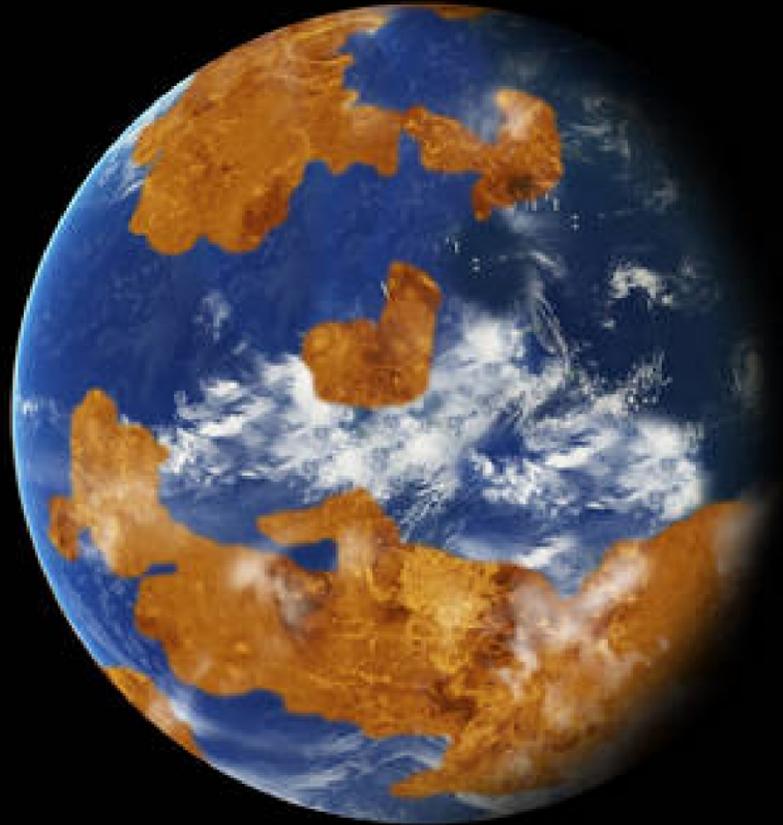
Conference detail can be found here: <https://www.giss.nasa.gov/meetings/venus2020/>

- Register/contribute a talk here:

https://docs.google.com/forms/d/e/1FAIpQLSe_sLS5O55px7DiJbBJk6lhnS4VCmz8UJgEzHsyB0R6FPk5Aw/viewform?usp=sf_link

- This virtual conference is co-hosted remotely by the NASA Goddard Institute for Space Studies and the Akatsuki Science Team.

VENUS



THE ORIGINAL
OCEAN WORLD